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Second Five-Year Review Report

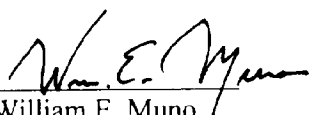
**for
Oak Grove Sanitary Landfill
City of Oak Grove
Anoka County, Minnesota**

August, 2002

PREPARED BY:

U.S. EPA - Region 5

Approved by:


William E. Muno
Director Superfund Division

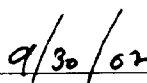

Date

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List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decreed
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
EPA	United States Environmental Protection Agency
GWOU	Groundwater Operable Unit
MPCA	Minnesota Pollution Control Agency
NOC	Notice of Compliance
O & M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCOR	Preliminary Close Out Report
PRP	Potentiall Responsible Party
RA	Remedial Action
RD	Remedial Design
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SCOU	Source Control Operable Unite
VOC	Volatile Organic Compounds

Executive Summary

The remedy selected at the Oak Grove Sanitary Landfill Superfund site in Oak Grove, Minnesota included:

- The installation of an enhanced cover incorporating a high permeability sand layer to promote passive gas venting; a synthetic landfill cap (40 mil. HDPE) to prevent infiltration of precipitation; rooting zone soils; top soils; and a passive gas vent system connected by lateral lines. By limiting infiltration this cover system limits the generation of landfill leachate that contributes to groundwater contamination.
- The design of an active gas extraction system for the entire site.
- Long term groundwater monitoring program to assess trends in water quality down gradient of the landfill.

The Site achieved construction completion with the signing of the Preliminary Close Out Report on August 13, 1993. The trigger for this five-year review was the actual completion of the first five-year on September 16, 1997.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD), the remedy is functioning as designed, source control measures (low permeability cover over the landfill) has achieved its design criteria by significantly reducing both the production of leachate and toxicity of the compounds released from the landfill, and since the cover was constructed, there has been a reduction in the contaminant concentrations in the groundwater.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name (from WasteLAN): Oak Grove Sanitary Landfill		
EPA ID (from WasteLAN): MND98090405		
Region: 5	State: MN	City/County: Anoka County
SITE STATUS		
NPL status: <input type="checkbox"/> Final <input checked="" type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) _____		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Construction completion date: 08 / 13 / 1993	
Has site been put into reuse? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> Portions		
REVIEW STATUS		
Lead agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____		
An author name: Gladys Beard/ State PM Name Jean Hanson		
Author title: NPL State Deletion Process Manager	Author affiliation: U.S. EPA, Region 5	
Review period: ** 12 / 04 / 01 to 09 / 30 / 02		
Date(s) of site inspection: 08 / 07 / 02		
Type of review: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Non-NPL Remedial Action Site <input checked="" type="checkbox"/> NPL State/Tribe-lead </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Regional Discretion </div>		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____		
Triggering action: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Other (specify) _____ </div>		
Triggering action date (from WasteLAN): 09 / 16 / 1997		
Due date (five years after triggering action date): 09 / 16 / 02		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

FIVE-YEAR REVIEW SUMMARY FORM, cont'd

Issues:

Continue with routine site maintenance including annual mowing of the vegetative cover, site inspections of cover and integrity cover. Continue with groundwater and surface water sampling program.

Recommendation and Follow-up Actions:

Evaluate potential migration of groundwater contaminants and take additional sampling and groundwater analysis.

Continue with routine site maintenance and annual mowing to the cover, site inspection and groundwater.

A network of gas monitoring probes will be installed around the landfill during 2003 which were designed to detect migration of landfill gas and thereby evaluate the effectiveness of the newly installed active gas extraction system.

Protectiveness Statement(s):

All immediate threats at the site have been addressed, and the remedy is protective in the short-term of human health and the environment.

Long-Term Protectiveness:

Long-term protectiveness at the Oak Grove Sanitary Landfill Superfund site (the Site) will be achieved by continuing the long-term monitoring of the ground water system. Long-term groundwater monitoring has demonstrated that the concentrations of the chemicals of concern have declined close to or below cleanup goals. Long-term trends show significant and adequate improvements in ground water quality.

The source control provided is a low permeability cover over the Site's landfill. The cover has achieved its design criteria by significantly reducing both the production of leachate and the toxicity of the compounds released from the Site's landfill. Maintenance of the Site's landfill covers such as mowing, inspections for erosion or other damage and maintaining proper slopes for positive drainage off the fill area, will continue in order to maintain the integrity of the cover system.

Other Comments:

None.

**Oak Grove Sanitary Landfill
Oak Grove, Minnesota
Second five-year Review Report**

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The Minnesota Pollution Control Agency (MPCA) and the United States Environmental Protection Agency (EPA), Region 5, conducted the five-year review of the remedy implemented at the Site. This review was conducted by the Project Managers for the entire site from December 2001 through September 2002. This report documents the results of the review.

This is the second five-year review for the Site. The triggering action for this five-year review is the completion of the first Five Year Review in September 16, 1997. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

I. Site Chronology

Table 1 - Chronology of Site Events

Event	Date
NPL RP Search	9/30/1985
Removal Assessment	1989-1991
Proposal to NPL	10/15/1984
Final listing on EPA National Priorities List	6/10/1986
Administrative Records Start	3/20/1988
Remedial Investigation/Feasibility Study (RI/FS) made available to public	9/30/1988
Proposed plan identifying EPA's preferred remedy presented to public; start of public comment period.	1988 & 1990
ROD for SCOU	1988
ROD for GWOU	1990
Consent Decree finalizing settlement for responsible party performance of remedy entered by Federal Court	1994
Remedial Design Start	1988
Remedial Design Complete	1991
Remedial Action Start	1992
Remedial Action Complete	1993
Pre-final inspection	08/10/1993
Pre-final inspection of Phase II remedial action	1993
Preliminary Close Out Report signed	8/13/1993
Deletion from the NPL	10/17/1999

III. Background

Physical Characteristics

The Site is located in the City of Oak Grove, Anoka County, (T33N, R24W, Sect. 28). Figure 1 provides a Site location map. The waste footprint of the Site's landfill is approximately 50 acres and contains approximately 2,500,000 cubic yards of waste. The Site's landfill was under private ownership when in operation.

Land and Resource Use

In accordance with the legislation enacted in 1992, (Minn. Laws 1992, Ch. 513, Art. 2, Sec. 2, Subd.3), the Minnesota Pollution Control Agency (MPCA) assessed and classified closed landfills in Minnesota. According to that assessment and classification, the Site's landfill was given a rank of A and a score of 41. This classification was revised following final cover reconstruction and installation of both passive and active gas wells in 1993. The revised rank was D and the score was 16.5.

The Binding Agreement between the Egan Family Trust and the Closed Landfill Program of MPCA was signed March 5, 1996 and the Notice of Compliance (NOC) was issued on April 17, 1996. This agreement was a three party agreement between the City of Oak Grove, the Egan Family Trust and the MPCA. The MPCA removed this site from the Permanent List of Priorities in June of 1996. The EPA delisted this site from the National Priorities List (NPL) on October 17th, 1996.

The Site's landfill was reclassified to a rank of B in 1997 due to concerns of landfill gas migration and the potential risks to nearby homes. These homes were subsequently purchased and demolished by the MPCA. The active gas extraction system, which functioned poorly during freezing weather, was turned off and the extraction wells were allowed to passively vent. The Landfill classification was again revised to a rank of D following this action. The rank of D indicates that the landfill poses an imminent threat to public health.

The MPCA signed a settlement with the Egan Family Trust on December 21, 1999. This settlement was a three party agreement between the City of Oak Grove, the Egan Family Trust and the MPCA. \$30,000 in reimbursement was being held by the City of Oak Grove until the Egan Homestead property was cleaned up. MPCA gained clear title of the Site's landfill in January, 2000.

History of Contamination

The Site's landfill began operations in 1967 as an open dump receiving mixed municipal and industrial solid waste. A solid waste landfill permit was issued to the owner of the Site by the MPCA. In 1976, landfill operations were resumed by a group of nine refuse haulers. All landfilling operations ceased in January 1984, when the operation license was suspended. However, industrial solid and liquid waste were present in the Site's landfill such as sludges, solvent wastes, sands, acids, chlorinated and un-chlorinated compounds, cutting oils, organic compounds, cleaning solvents and inks.

Initial Response

Groundwater contamination was discovered in monitoring wells at the Site in 1984 and the MPCA issued a Request for Response Action (RFRA) to the owners and operators of the Site's landfill on August 28, 1994. The RFRA was issued for the purpose of completing closure activities and initiating a Remedial Investigation/Feasibility Study (RI/FS) to determine the magnitude of contamination.

After reviewing data from the Site, the Site was included on the NPL on June 10, 1986. In 1985 an RI/FS under the Comprehensive Response, Compensation and Liability Act (CERCLA) was initiated. The RI/FS was completed in 1990 and a record of decision (ROD) for the source control operable unit (SCOU) was finalized in September 30, 1988 and the groundwater operable unit (GWOU) ROD was finalized in December 20, 1990.

Basis for Taking Action

Contaminants

Hazardous substances that have been released at the Site in each media include:

Soil

acetone
methylene chloride
toluene
ethyl benzene
xylenes
chloroform
xylene
2-butanone

Groundwater

Xylenes
Arsenic

Surface Water

Chloroethane
methylene chloride
acetone
1,1-dichloroethane
4-methyl-2-pentanone
4-methylphenol
benzoic acid
chromium
barium
vanadium
cyanide
Trichloroethene
Trans-1,2-dichloroethene

Leachate

acetone
methylene chloride
toluene
2-butanone
methyl ethyl ketone
4-methyl-2-pentanone
4-methylphenol
benzoic acid
DDT

Wetland

Chloroethane
methylene chloride
1,1-dichloroethane

Groundwater

VOCs
Arsenic
Barium
Nickel
Zinc
PCBs
Nutrient parameters

Exposure to soil and groundwater leachate are associated with significant human health risks, due to exceedance of EPA's risk management criteria for either the average or the reasonable maximum exposure scenarios. The carcinogenic risks were exposures to all media due to the high concentrations of carcinogenic polycyclic aromatic hydrocarbons (PAHs) and volatile organic compound (VOC). Potential risks associated with exposure to the site are attributed to the presence of a variety of VOC contaminants that exist at concentrations that exceed State and Federal MCLs. Implementation of the remedies have eliminated exposure routes.

IV. Remedial Actions

Remedy Selection

The remedial action for the Site includes two operable units. The first operable unit addresses the source of contamination by containing the on site waste and contaminated soil. The function of this operable unit is to provide a final cover system for the landfill which will prevent or minimize groundwater contamination and risks associated with exposure to the contaminated materials. The ROD for this Operable Unit was signed on September 30, 1988.

The second operable unit addresses groundwater remediation. Results from the second operable unit RI/FS indicates that groundwater contamination was being remediated via natural attenuation. Contaminated groundwater from the shallow aquifer discharges to the adjacent wetlands by exiting through peat deposits. The peat deposits act as a natural filter by removing the contaminants. Installing a groundwater pump out system to remove the groundwater contaminants would have destroyed the adjacent wetland. Consequently, continued monitoring without active remediation was proposed for the second operable unit ROD. The ROD for the second operable unit was signed on December 20, 1990, and states that an active treatment system may be required if the results from such monitoring indicates that natural attenuation is not sufficient to remediate the groundwater.

The cover system described in the first operable unit ROD, in conjunction with the groundwater monitoring in the second operable unit ROD, comprises the final remedial action for the Site.

Remedial Action Objectives (RAOs) were developed as a result of data collected during the Remedial Investigation to aid in the development and screening of remedial alternatives to be considered for the ROD. The RAOs for the Site were divided into the following groups:

Source Control Response Objectives

- Minimize the migration of contaminants from the property soils and leachate to groundwater;
- Reduce risks to human health by preventing direct contact with, and ingestion of, contaminants in the property soils, wetland and leachate; and prevent potential ingestion of contaminated groundwater;
- Reduce risks to the environment by preventing direct contact with, and ingestion of, contaminants in the wetland; and
- Minimize the migration of contaminants (*i.e.*, from property soils, leachate, and wetland) that could result in surface water concentrations in excess of Water Quality Criteria.

Management of Groundwater Response Objectives

- Eliminate or minimize the threat posed to human health and the environment by preventing exposure to groundwater contaminants;
- Prevent further migration of groundwater contamination beyond its current extent; and
- Restore contaminated groundwater to Federal and State applicable or relevant and appropriate requirements (ARARs), including drinking water standards, and to a level that is protective of human health and the environment within a reasonable period of time.

The major components of the source control remedy selected in the ROD include the following:

1. Installing a security fence around the landfill site;
2. Capping with a final cover system consisting of a gas control layer, a barrier layer of low permeable material or a flexible membrane, and a drainage layer;
3. Topsoil cover and vegetation;
4. Site deed restrictions limiting further use of the site;
5. Treatment options for air emissions from gas vents will be considered after construction of the final cover;
6. Consideration during design of the need for extra protection from frost damage without significantly increasing cost or the likelihood of failure; and
7. Air and groundwater monitoring to ensure the effectiveness of the remedial action.

The major components of the groundwater remedy selected in the groundwater ROD include the following:

1. Long-term monitoring of the shallow and deep aquifers for chemical of concerns.
2. Long-term monitoring of surface water for the same constituents which are monitored for in groundwater. Surface water monitoring points will be established based on a conductivity survey.

3. Long-term monitoring of sediments.
4. Sediments, ground and surface waters sampling;
5. Implementation of institutional controls and non-essential wells would be abandoned.
6. Natural attenuation of shallow groundwater.

Remedy Implementation

The final remedy was implemented December 23, 1991. The construction components of the remedy are as follows:

- Install fence around the perimeter of the landfill.
- Install, operate and maintain a groundwater, surface water and sediment monitoring program
- Install, a multi layer cover. The components of the this cover include a 24 inch soil layer, a six to twelve inch drainage layer, a 60 mil geomembrane layer, a gas venting/collection system and a foundation layer of at least 12 inches in thickness.
- Install, operate and maintain an ambient air monitoring program around the perimeter of the landfill.

Construction activities at the Site occurred over two construction seasons. The first season began June 1992 and concluded October 1992. During this period new wells were installed, old wells were abandoned, permanent surface water and sediment sample points were established, a round of sampling occurred, debris was cleared from the Site and a portion of the fence was installed.

The second phase of construction began February 1993 and was concluded August 20, 1993 with the demobilization of equipment from the Site. The majority of work performed under phase two dealt with the construction of the cover system.

A pre-final inspection was conducted on August 10, 1993. A Preliminary Close Out Report (PCOR) was signed on August 13, 1993.

System Operation/Operation and Maintenance

In 1993 a final cover using a 60-mil geosynthetic barrier layer was constructed. Additionally, passive gas vents and eight active gas extraction wells were installed. There was some minor erosion of the cap noted during the 1997 inspections. In 1998 the following cover work was conducted:

- The landfill cover was fertilized;
- The landfill cover was mowed; and
- Some areas of minor erosion were corrected.

The Site does not have a Leachate Management System for leachate collection and the landfill is unlined.

In 2000, MPCA sent out a Level of Effort request to upgrade the gas extraction system to include the entire landfill. The design was completed in 2001 and construction of an active gas extraction system and a flare system for the entire site will be completed by the end of 2002. Installation of this system will reduce landfill gases emissions and reduce VOC migration to the local ground water. Prior to this work, the Site had a passive gas venting system operating.

There are 17 gas-monitoring probes installed around the perimeter of the site to monitor for the presence of landfill gas in the soil. There are five gas-monitoring probes located along the north side of the landfill that, at times, exceeded the 100% lower explosive limit (LEL) for methane in 2001. However, because houses adjacent to the landfill were removed, there are no residences currently at risk from the migration of landfill gas. Regular monitoring of the gas monitoring probes was conducted in 2001. Table 1 in the attachments summarizes the gas monitoring data collected in 2001.

A number of the groundwater monitoring wells have been abandoned at this site after completion of the Remedial Investigation and the installation of the site cap. The current groundwater monitoring system is adequate for the long-term monitoring needs at this site. Table 2 provides a summary of annual O&M costs.

Table 2 - Annual System Operations/O&M Costs

Dates		Total Cost rounded to nearest \$1,000
From	To	
7/2000	6/2001	\$145,110

V. Progress Since the Last Five-Year Review

Since the last Five-Year Review Report was prepared, the MPCA has continued with routine site maintenance, including annual mowing of the vegetative cover and site inspections of cover integrity.

The site was surveyed in 2001 in anticipation of active gas system construction. Construction of the full site active gas extraction and flare system. Operate and trouble shoot system over 2002-2003.

VI. Five-year Review Process

Administrative Components

This Five-Year Review Report was written and completed by EPA, based on the technical review of the Site by members of the MPCA staff. This Five-Year Review Report was written by Gladys Beard of EPA.

From July 2001 to June 2002 the review team established the review schedule whose components included:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Local Interviews; and
- Five-Year Review Report Development and Review.

The schedule extended through September 2002.

Community Involvement

A notice will be made to the public announcing the completion of the Five-Year Review Report and providing a summary of Five-Year Review findings, protectiveness of the remedy, and advising the community where a copy of the review report can be found. This Five-Year Review Report can be found in the Site's Information Repository.

Document Review

This Five-Year Review consisted of a review of relevant documents including O&M records, monitoring data, and the MPCA's August 30, 2002 report titled "2001 Annual Report, Five-Year Review." All cleanup standards in the ROD were reviewed.

Data Review

Groundwater Monitoring

Groundwater monitoring has been conducted at the Site since the 1980s. In general, most contaminants were detected at their highest levels early in the RI/FS history of the Site.

Three rounds of water quality samples were collected by Interpoll laboratories, Inc. in 2001, as had been done in previous years. The Site's groundwater monitoring well system currently consists of 12 wells and 3 surface water sampling points. A map showing the location of the groundwater monitoring well system is presented in Figure 2.

Figure 3 presents a groundwater contours and flow direction map based on the 12 monitoring wells. Figure 9 is a graph of groundwater levels at select wells. Review of groundwater data indicates that the groundwater flow direction in the surficial aquifer is to the south. The lower aquifer is protected from the landfill contamination by a layer of clay till and by the fact that the surficial aquifer discharges to the wetland along the southern boundary of the fill area. This is presented schematically in the Figure 4 (geologic cross section).

Groundwater quality analytical data obtained from the sampling events is divided into inorganic and organic sets. Groundwater quality data collected from the existing monitoring system at the Site is tabulated in the attached spreadsheets (Table 2A) and trends are graphically summarized in Figures 5 through 8.

Groundwater samples collected from monitoring wells have shown impacts from organic and inorganic parameters. The general long-term trends at this Site show an improvement in groundwater quality. Currently the only exceedance of groundwater standards is that for benzene in MW-302D (see Figure 8). Although some of the groundwater trends at this Site are ambiguous (i.e. neither clearly improving or getting worse), some wells, such as MW302S clearly show long-term improvement in the groundwater quality. With the addition of an active gas extraction system, additional improvement trends are expected.

Laboratory analyses of inorganic and organic parameters were performed by Minnesota Department of Health (MDH).

No groundwater remediation system is currently operating at the Site. The installation of the active gas system and maintenance of the cover is expected to lead to improved ground water quality.

Surface Water Monitoring

In 2000, surface water samples were collected from two sampling locations and the detection of VOCs were in the low ppb range.

In 2001, surface water samples were again collected from two sampling locations. These recent surface water samples indicate that there are no impacts from the Site. A graph showing historical trends in surface water quality is shown as Figure 10. Figure 11 is a graph of recent trends in surface water VOCs.

Site Inspection

Regular inspections related to the landfill conditions were completed during 2001. No major issues were identified in these inspections. Site inspections take place on a regular basis and will continue on a long-term basis.

Interviews

In processing this report U.S. EPA interviewed the MPCA to obtain information. None of MPCA staff were able to identify any concerns regarding the Site and there had not been any emergency responses at the Site.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARS, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD. The stabilization and capping of contaminated soils and sediments has achieved the remedial objectives to minimize the migration of contaminants to groundwater and surface water and prevent direct contact with, or ingestion of, contaminants in soil and sediments. The effective implementation of institutional controls has prevented exposure to, or ingestion of, contaminated groundwater.

Operation and maintenance (O&M) of the cap and wells has been effective. O&M annual costs are consistent with original estimates and there are no indications on any difficulties with the remedy.

No activities were observed that would have violated the institutional controls. The cap and the surrounding area were undisturbed, and no new uses of groundwater were observed. The fence around the Site is intact and in good repair.

Question B: Are the exposure assumptions, toxicity data cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (older child trespasser, adult trespasser) and potential future exposures (young and older future child resident, future adult resident and future adult worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected and it is expected that all groundwater cleanup levels will be met within approximately time frame stated in the ROD.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No ecological targets were identified during the baseline risk assessment and none were identified during the five-year review, and therefore monitoring of ecological targets is not necessary. All sediment and surface water samples analyzed found no contamination of wetlands or surface water. No weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There has been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Table 3 - Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Continue with routine site maintenance including annual mowing of the vegetative cover and site inspections of the cover's integrity.	N	N
Continue with groundwater and surface water sampling program.	N	N

IX. Recommendations and Follow-Up Actions

Table 4 - Recommendations and Follow-Up Actions

Issue	Recommendations Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Evaluate potential migration of ground water contaminants	Additional sampling and ground water analysis	PRPs	State	Within the next 6 months	N	Y
Continue with routine site Maintenance	Annual mowing to the cover, site inspection and groundwater	PRPs	State	Annually	N	N
Install gas monitoring probe network around the landfill during 2003.	Monitoring to detect migration of landfill gas and thereby evaluate the effectiveness of the newly installed active gas system	PRPs	State	2003	N	N

X. Protectiveness Statement

The remedy is protective in the short-term of human health and the environment. All immediate threats at the site have been addressed. All threats at the Site have been addressed through stabilization and capping of contaminated soil and sediments, the installation of fencing and warning signs, and the implementation of institutional controls.

Long-term protectiveness of human health and the environment will be achieved upon attainment of groundwater cleanup goals, through natural attenuation. In the interim, exposure pathways that could result in unacceptable risks are being controlled and institutional controls are preventing exposure to, or the ingestion of, contaminated groundwater.

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate potential migration of the contaminant. Current monitoring data indicate that the remedy is functioning as required to achieve groundwater cleanup goals.

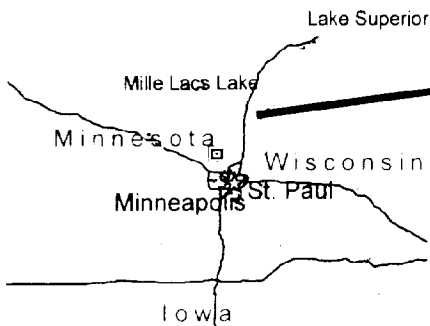
X. Next Review

The next five-year review for the Site is required by September 2007, five years from the date of this review.

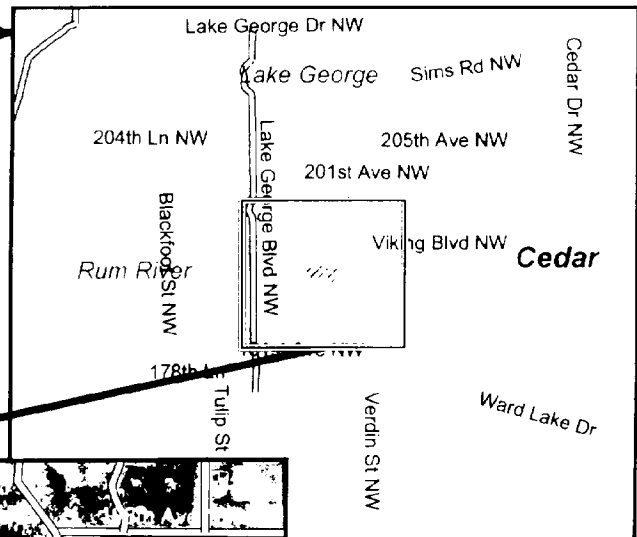
Figures

Oak Grove Sanitary Landfill Superfund Site Anoka County

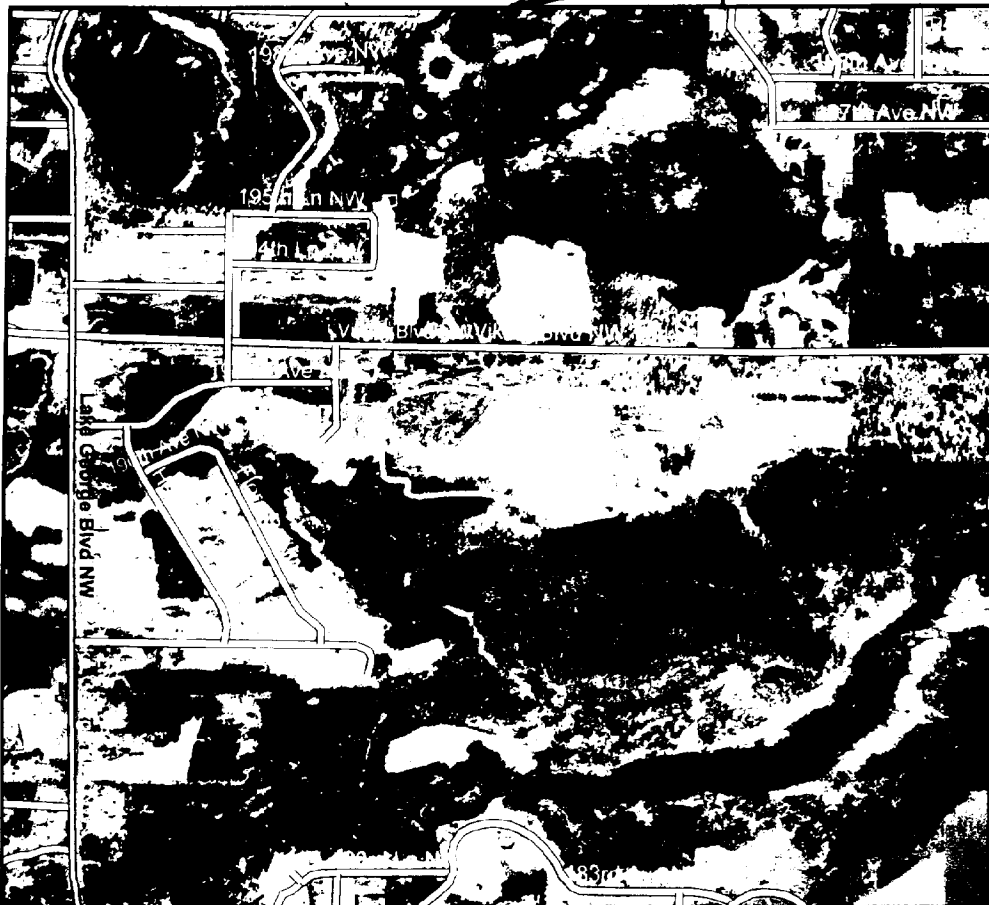
1) State



2) City of Cedar



3) Oak Grove Sanitary Landfill Site



8EPA United States
Environmental Protection Agency

Region 5 Superfund Office

Plot created by David Wilson, U.S. EPA Region 5
BAM Image Date: 4/7/1991

Figure 1

Oak Grove Sanitary Landfill

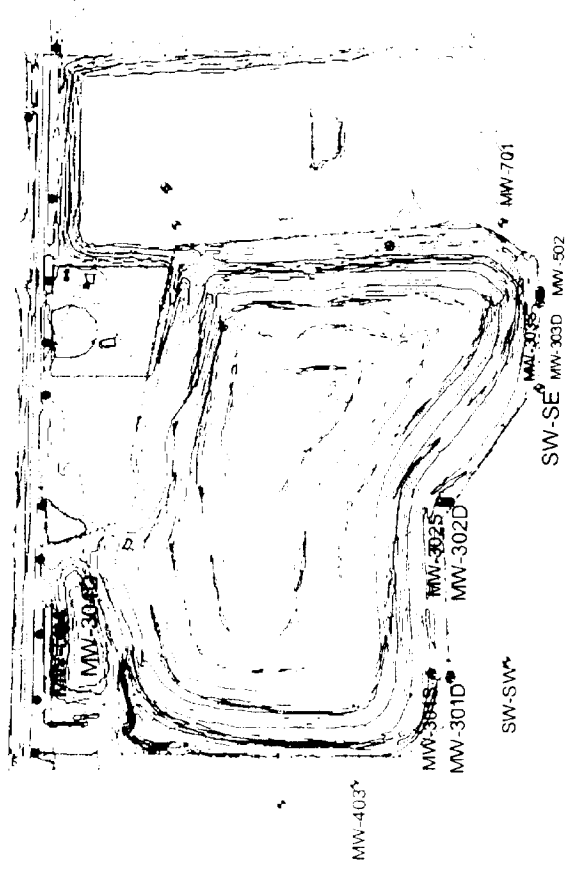
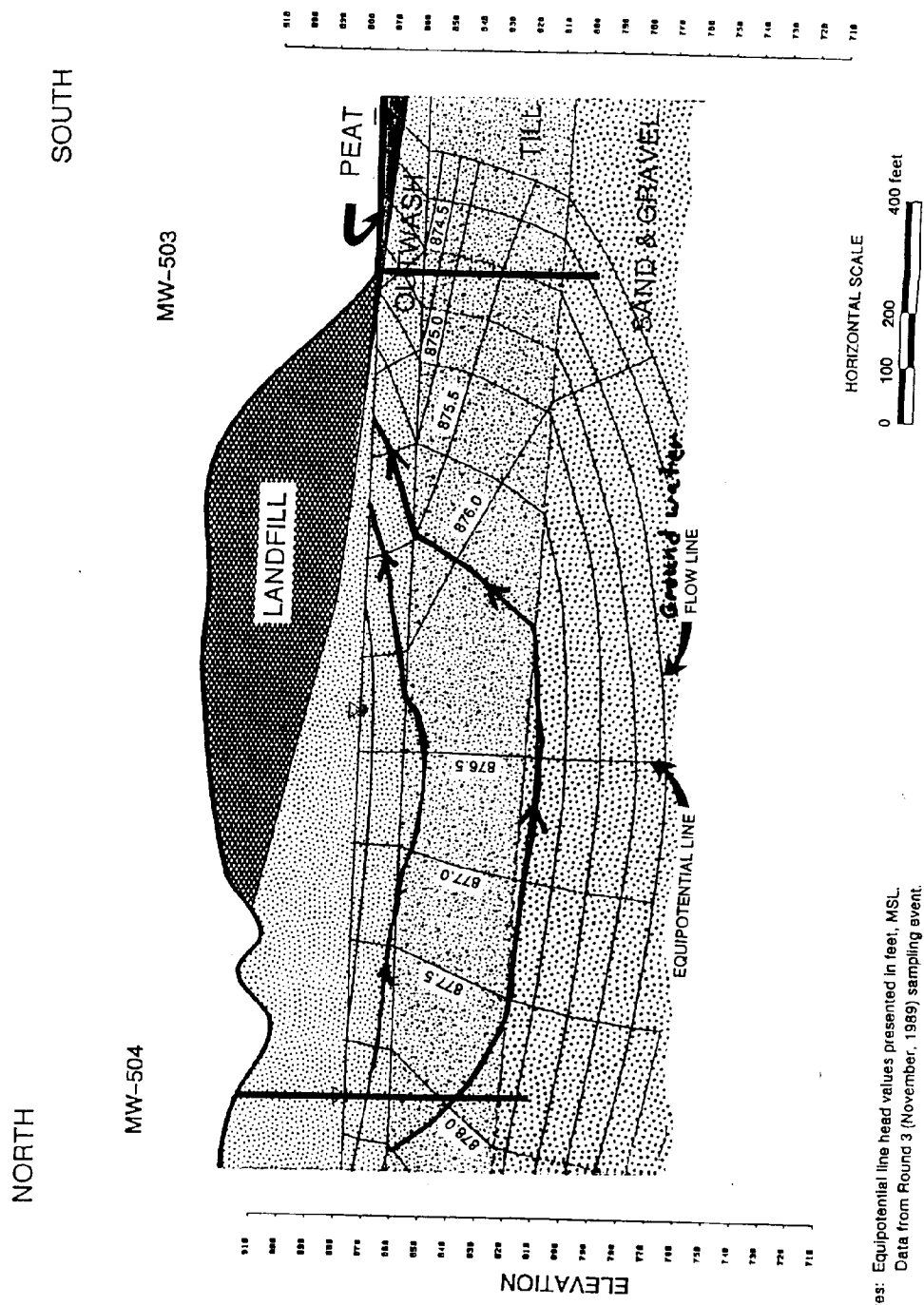


Figure 2 Oak Grove Monitoring Well Locations



Notes: Equipotential line head values presented in feet, MSL.
Data from Round 3 (November, 1989) sampling event.

Figure 4 – Generalized Geologic Cross Section

Oak Grove SLF Total VOC Conc. Trends @ Select Wells

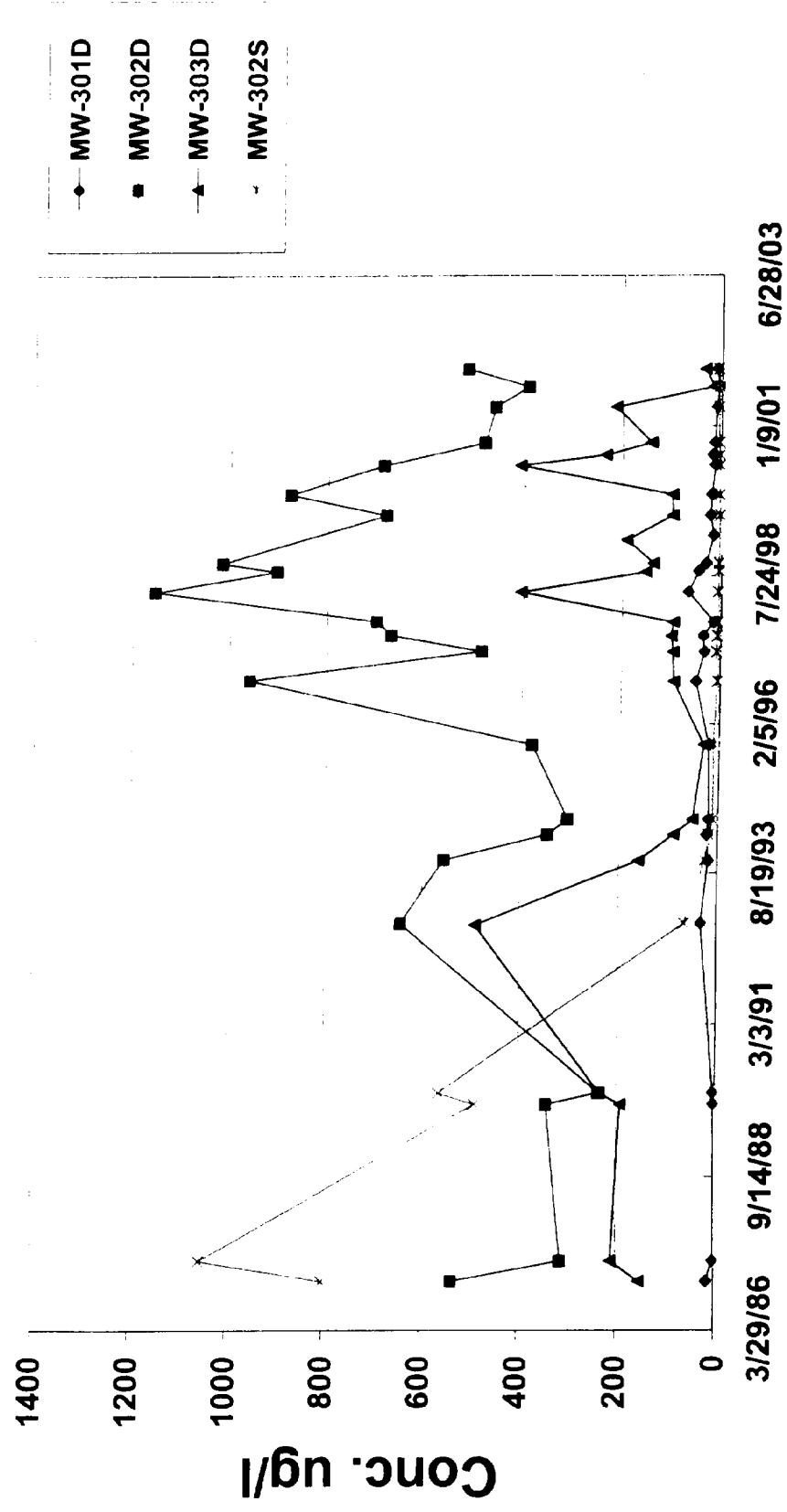


Figure 5

Oak Grove SLF Total VOC Conc. Trends @ Select Wells

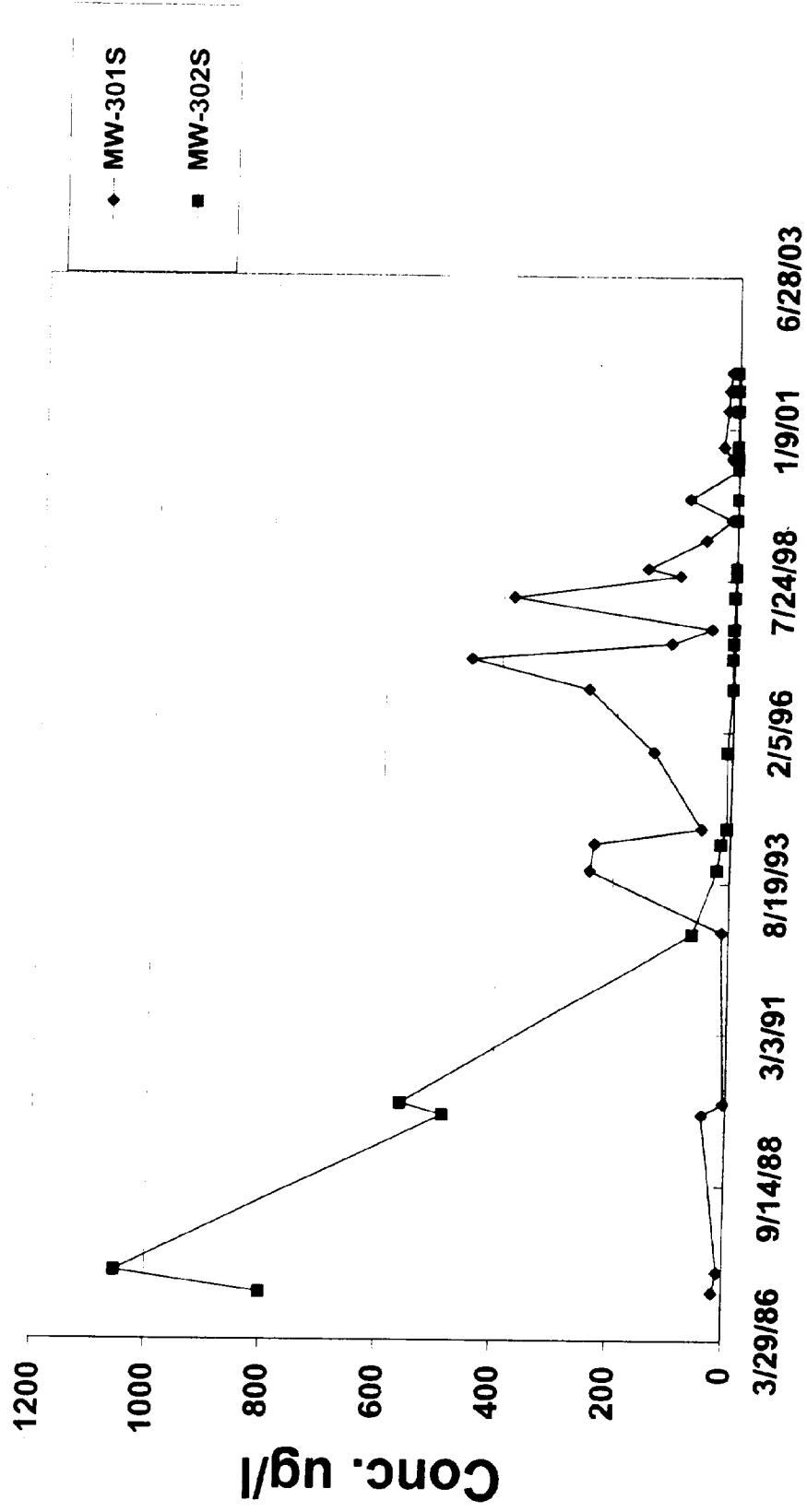


Figure 6

Oak Grove MW-302S Conc. Trends for Select Compounds

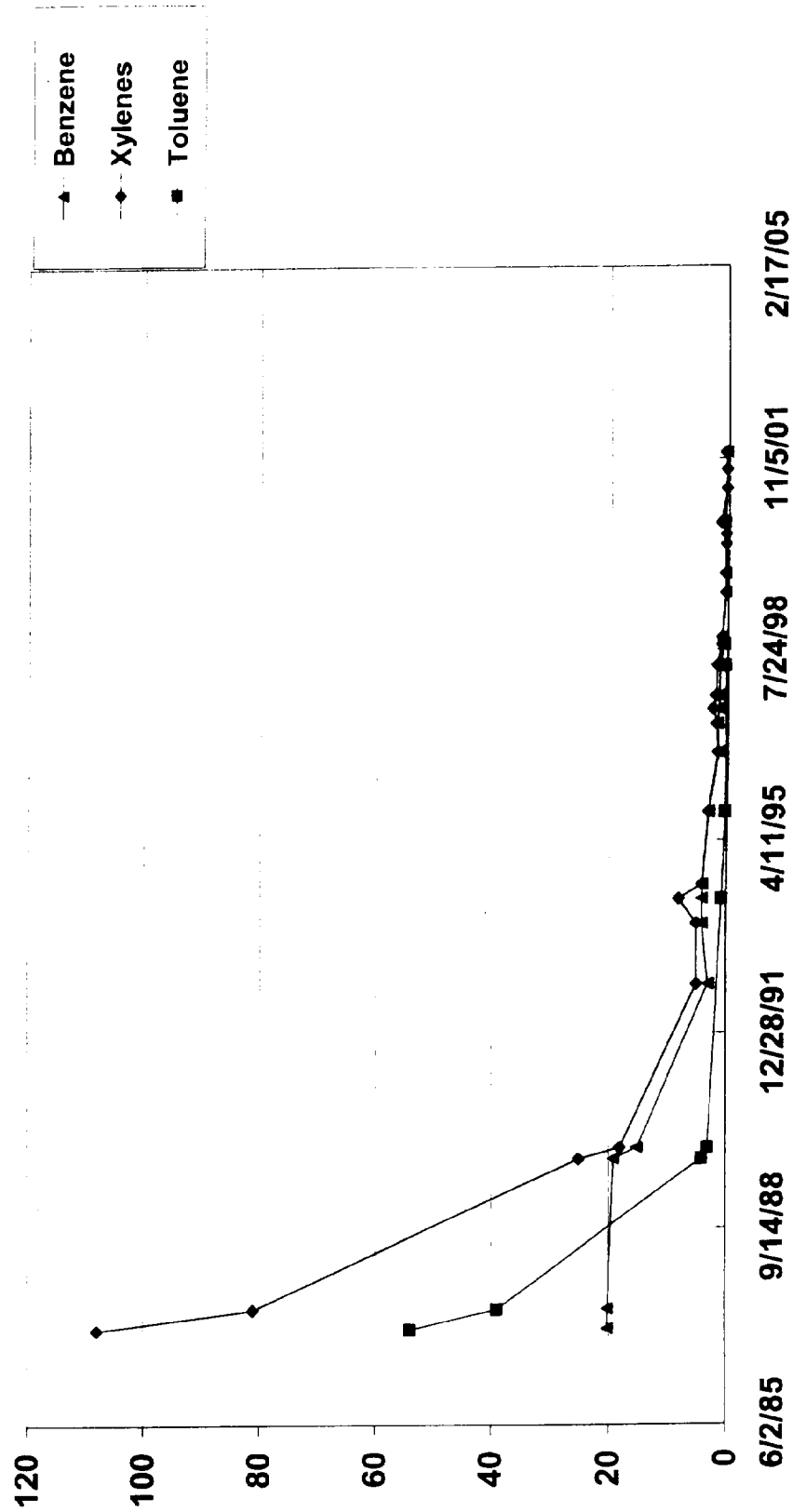


Figure 7

MW-302D Conc. Trends for Select Compounds

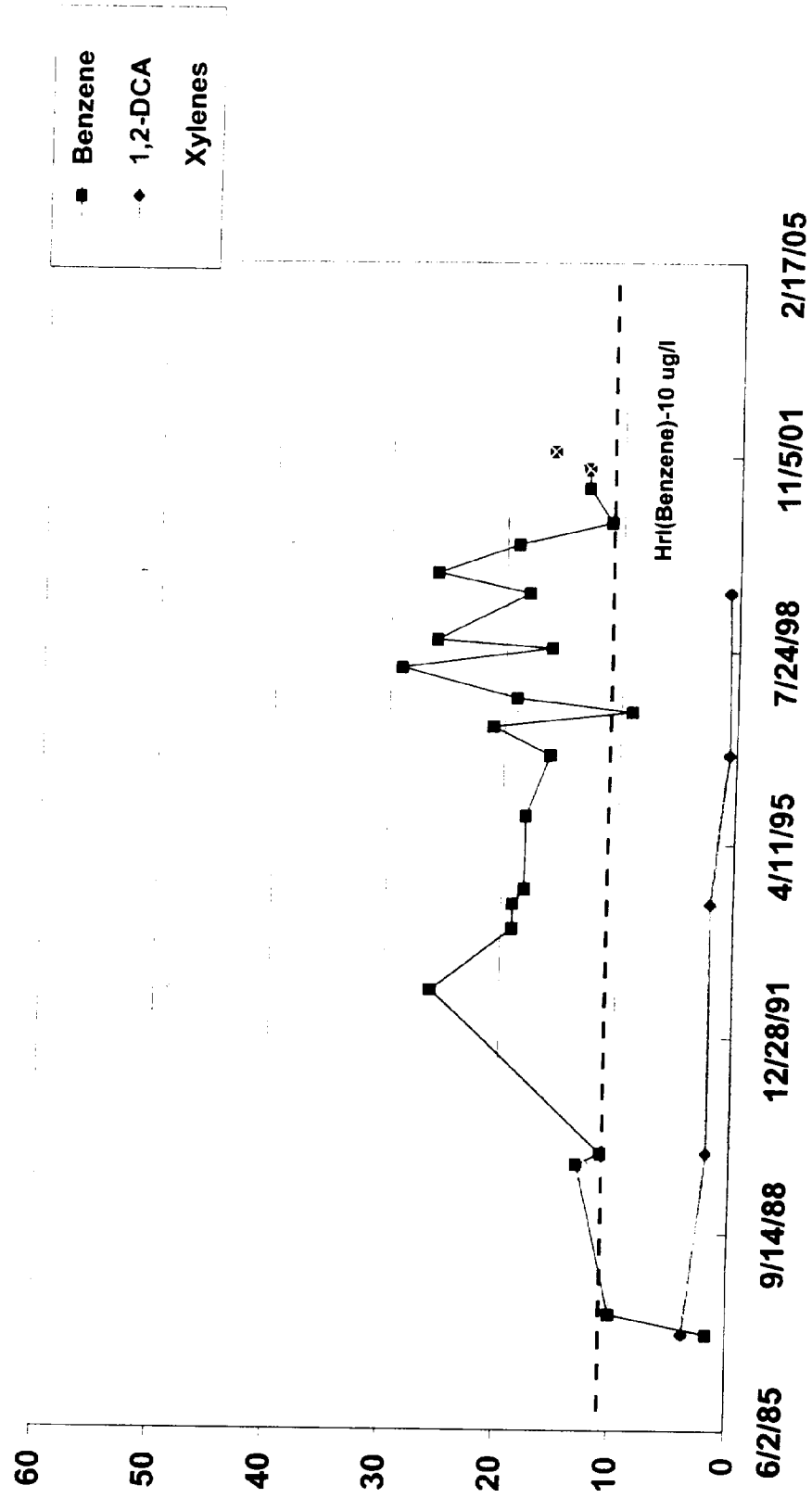


Figure 8

Oak Grove Water Levels at Select Wells

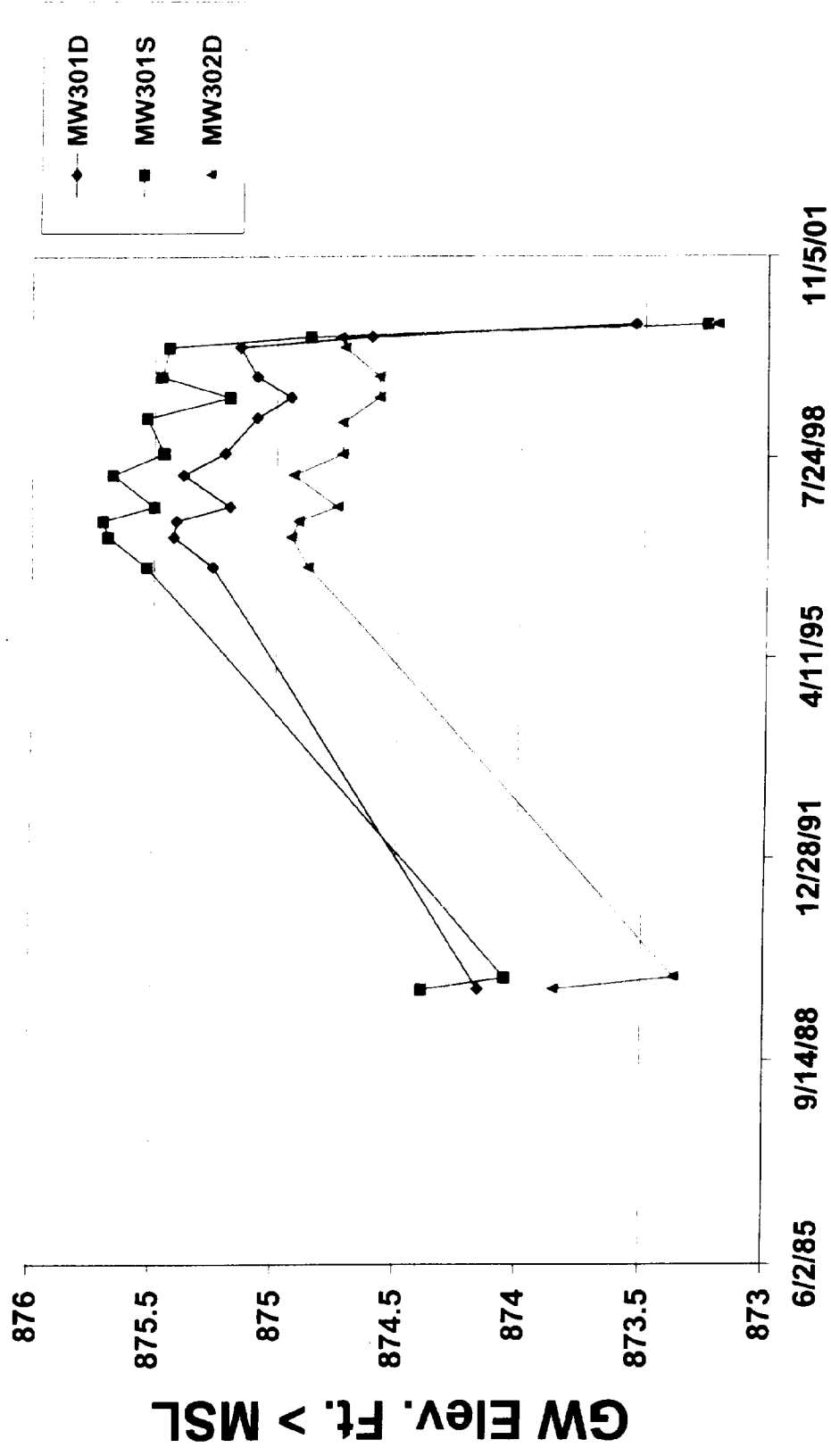


Figure 9

Oak Grove SLF-Total VOCs @ Surface Water Stations

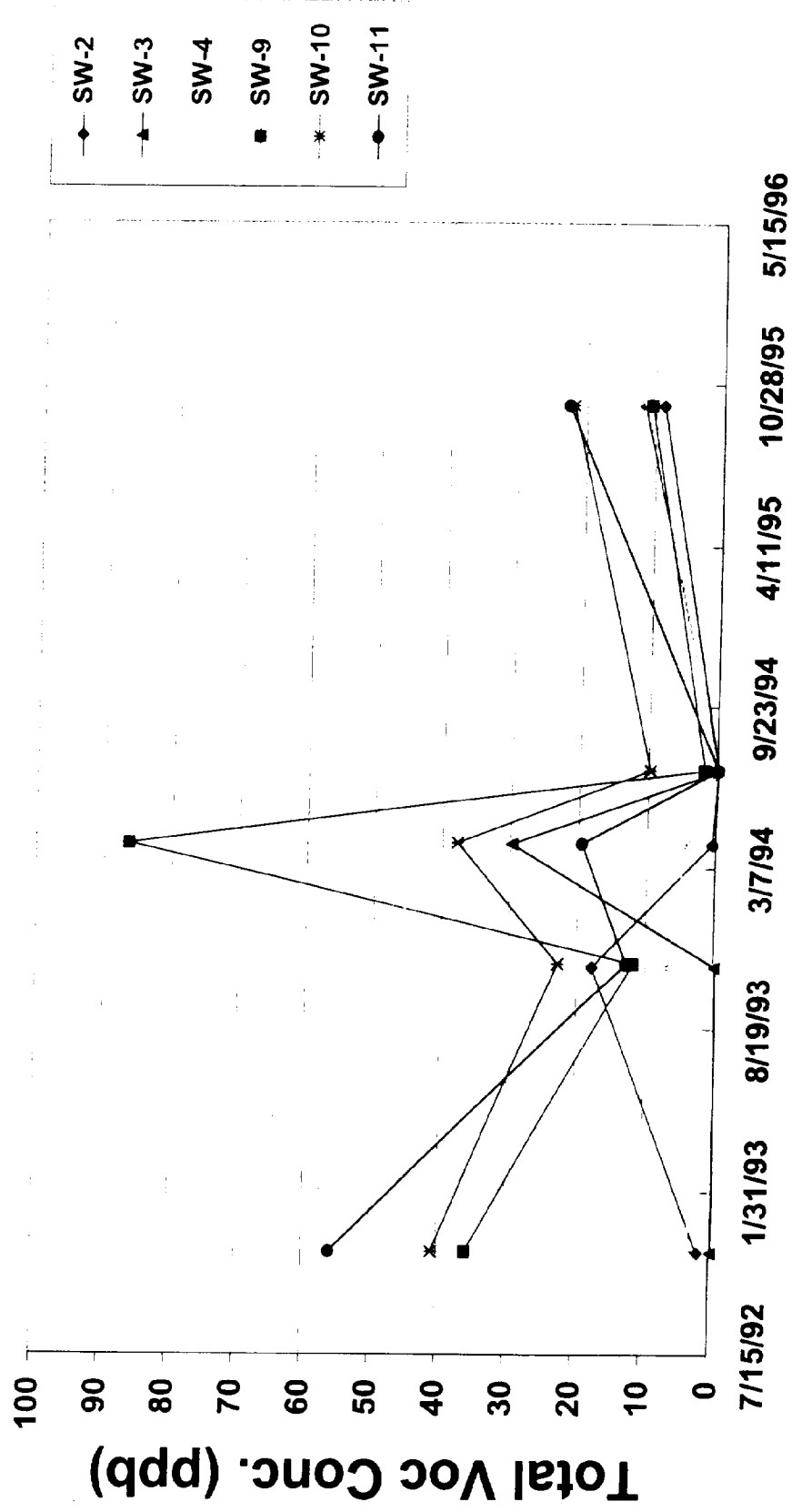


Figure 10

Oak Grove SLF-Total VOCs @ Post '96

Surface Water Stations

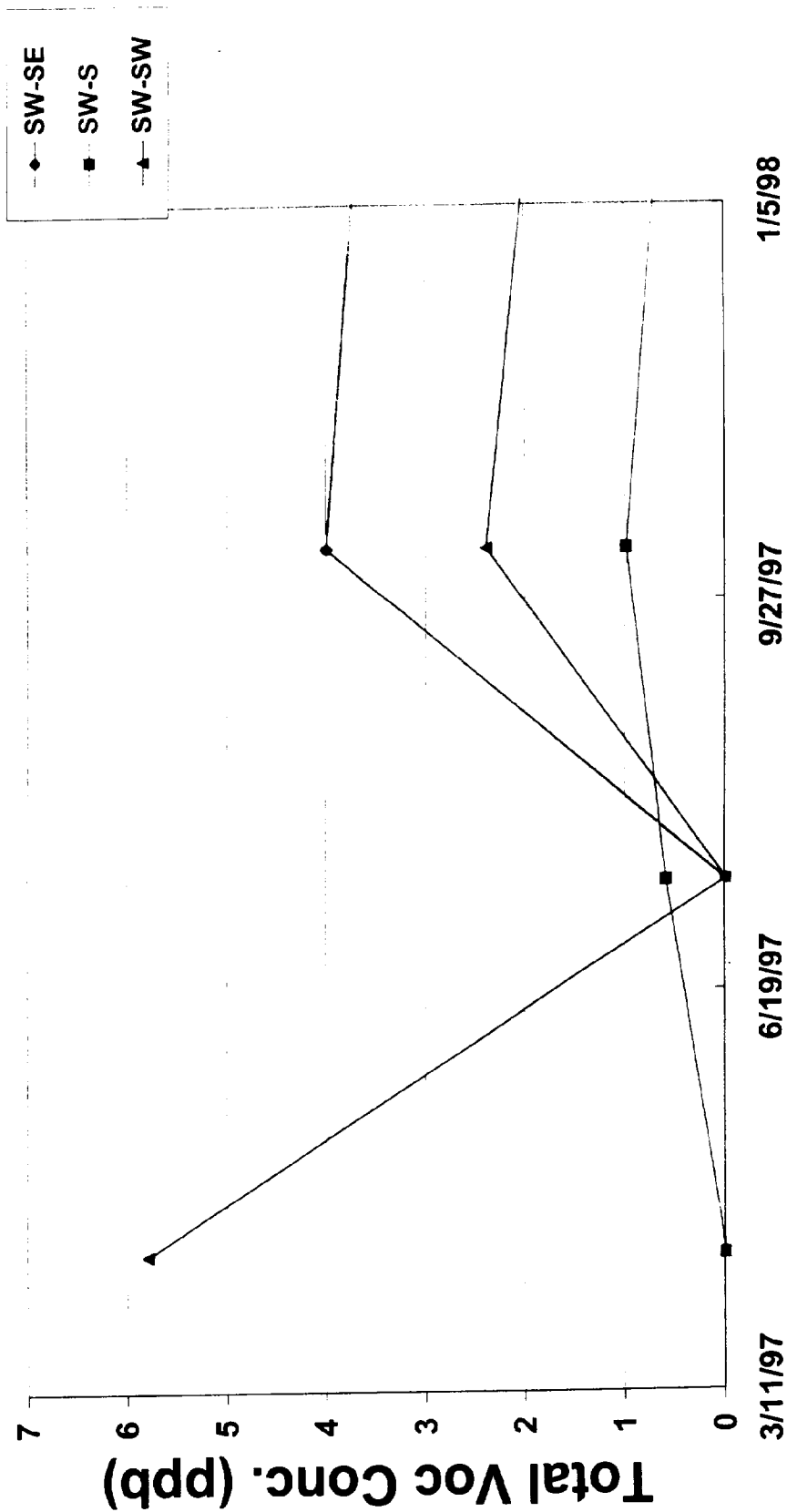


Figure 11

Tables

Table 1A

**Oak Grove SLF 2001 Gas Monitoring Data
% Methane by Volume**

Probe #	10-Feb-01	5-May-01	10-Aug-01	9-Nov-01
GP-1	0.00	0.00	0.00	0.00
GP-2	0.00	0.00	0.05	0.00
GP-3	0.00	0.00	0.00	0.00
GP-4	0.00	0.00	0.00	0.00
GP-5	0.00	0.00	0.05	0.00
GP-6	1.00	38.00	19.00	49.00
GP-7	4.40	4.50	10.00	29.00
GP-8	0.50	64.00	18.00	60.00
GP-9	1.80	52.00	49.00	49.00
GP-10	0.00	17.00	0.15	28.00
GP-11	0.00	0.15	0.05	0.10
GP-12	0.15	0.05	0.05	0.05
GP-13	0.10	0.00	0.00	0.00
GP-14	0.00	0.00	0.05	0.00
GP-15	0.00	0.00	0.75	0.00
GP-16	0.15	3.15	0.10	4.00
GP-17	0.10	0.10	0.05	0.10

Table 2A

Oak Grove Sanitary Landfill				Acetone	Benzene	2 Butanone	Carbon Disulfide	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	2-Chlorotoluene	1,2 Dichlorobenzene	1,3 Dichlorobenzene	1,4 Dichlorobenzene	Dichlorodifluoromethane	1,1 Dichloroethane
WELL NUMBER	SAMPLE DATE	Sample ID No	LABORATORY														
	OLD I.L.=																
	NEW RAL=			700	10			15		1.3			155	155	18.8		
	NEW HRL=			700.0	10.0			100		60			600	600	10	1000	70
MW-301D	5/1/01	200109945	MDH						1.3								0.2
MW-301D	8/28/01	200129321	MDH						0.5								
MW-301D	12/13/01	200138978	MDH						1.1								0.3
MW-301S	5/1/01	200109948	MDH	450*													
MW-301S	8/28/01	200129322	MDH														
MW-301S	12/13/01	200138979	MDH														
MW-302D	5/1/01	200109944	MDH		13			2	150								
MW-302D	8/28/01	200129325	MDH		13			2	120								
MW-302D	12/13/01	200138977	MDH		16			3	120								
MW-302S	5/1/01	200109942	MDH									2.1					
MW-302S	8/28/01	200129323	MDH									2.8					
MW-302S	12/13/01	200138976	MDH		0.2							3					
MW-303D	5/1/01	200109934	MDH		11			0.6	1.4						0.7		0.3
MW-303D	8/28/01	200129326	MDH		1.4										0.4		
MW-303D	12/13/01	200138975	MDH		2.5										0.3		0.2
MW-304D	5/1/01	200109938	MDH														
MW-304D	8/27/01	200129317	MDH														
MW-304D	12/13/01	200138974	MDH														
MW-403	5/1/01	200109936	MDH														
MW-403	8/27/01	200129316	MDH														
MW-403	12/12/01	200138970	MDH								1.2						
MW-502	5/1/01	200109940	MDH														
MW-502	8/28/01	200129328	MDH														
MW-502	12/12/01	200138972	MDH								0.9						
MW-503	5/1/01	200109941	MDH														
MW-503	8/28/01	200129324	MDH														
MW-503	12/12/01	200138973	MDH								1.1						
MW-504	5/1/01	200109937	MDH														
MW-504	8/28/01	200129318	MDH														
MW-504	12/12/01	200138971	MDH														
MW-701	4/30/01	200109932	MDH														
MW-701	8/28/01	200129319	MDH														
MW-701	12/12/01	200138968	MDH														
SW-S	5/1/01	200109943	MDH														
SW-SW	5/1/01	200109935	MDH														
TRIP BLANK	4/30/01	200109931	MDH														
TRIP BLANK	8/27/01	200129314	MDH	56													
TRIP BLANK	12/12/01	200138967	MDH														
FIELD BLANK	5/1/01	200109934	MDH														
FIELD BLANK	8/27/01	200129315	MDH														
FIELD BLANK	12/12/01	200138969	MDH														
LAB BLANK	11/29/92																
LAB BLANK	4/25/94																
MAXIMUM CONCENTRATION				56	16	0	0	3	150	0	12		0	0	0.7	0	0.3
IL EXCEEDANCE					4			0		0			0	0	0		
RAL EXCEEDANCE				0	4			0		0			0	0	0	0	0
HRL EXCEEDANCE				0	4			0		0			0			0	

Table 2A

Oak Grove Sanitary Landfill		1,2 Dichloroethane	1,2 Dichloroethylene cis	1,2 Dichloroethylene trans	1,2 Dichloroethylene Total	Dichlorofluoromethane	1,2 Dichloropropane	Ethyl Benzene	Ethyl Ether	Isopropylbenzene	p-Isopropyltoluene	Methylene Chloride	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Methyl tertiary butyl ether	4-Methyl-2-Pentanone	Naphthalene	Tetrahydrofuran	Toluene
WELL NUMBER	SAMPLE DATE																		
	OLD TL =	0.95	17	17			15	170				12	43						500
	NEW RAL =	4	70	100			5	700	1000			50	300	300				100	1000
	NEW HRL =	4.0		100.0				700.0	1000.0			50.0							1000.0
MW-301D	5/1/01								5.4										
MW-301D	8/28/01								2.7										
MW-301D	12/13/01								5.8										
MW-301S	5/1/01																		20
MW-301S	8/28/01																		18
MW-301S	12/13/01																		14
MW-302D	5/1/01			3					65									210	
MW-302D	8/28/01			2					80									180	
MW-302D	12/13/01			3			3	73										280	
MW-302S	5/1/01																		
MW-302S	8/28/01																		
MW-302S	12/13/01			0.1															
MW-303D	5/1/01			0.1				36	71	5.2					5.9		0.8	63	0.3
MW-303D	8/28/01							2.9	5.2	1.3							0.7		
MW-303D	12/13/01							1.8	12	0.8	0.6							13	
MW-304D	5/1/01																		
MW-304D	8/27/01																		
MW-304D	12/13/01																		
MW-403	5/1/01																		
MW-403	8/27/01																		
MW-403	12/12/01																		
MW-502	5/1/01																		
MW-502	8/29/01																		
MW-502	12/12/01																		
MW-503	5/1/01																		
MW-503	8/28/01																		
MW-503	12/12/01																		
MW-504	5/1/01																		
MW-504	8/28/01																		
MW-504	12/12/01																		
MW-701	4/30/01																		
MW-701	8/28/01																		
MW-701	12/12/01																		
SW-S	5/1/01																		
SW-SW	5/1/01																		
TRIP BLANK	4/30/01																		
TRIP BLANK	8/27/01																		
TRIP BLANK	12/12/01																		
FIELD BLANK	5/1/01																		
FIELD BLANK	8/27/01																		
FIELD BLANK	12/12/01																		
LAB BLANK	11/29/92											4							
LAB BLANK	4/25/94											2							
MAXIMUM CONCENTRATION		0	0	3	0	0	0	36	73			4	0	0		0		280	20
IL EXCEEDANCE		0	0	0			0	0				0	0						0
RAL EXCEEDANCE		0	0	0			0	0	0			0	0	0				3	0
HRL EXCEEDANCE		0		0				0	0			0							0

Table 2A(continued)

Oak Grove Sanitary Landfill	WELL NUMBER	SAMPLE DATE	1,1,1 Trichloroethane	1,1,2 Trichloroethylene	1,2,4-Trimethylbenzene	Vinyl Chloride	Xylenes m,p,o	TOTAL VOCs	No. of VOCs	Arsenic	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Zinc	Alkalinity, Total
		OLD TL =	50			0.037	110			12.5	1.25	30	325		5		0.75		
		NEW RAL =	800	30		0.1	1000			0.2	4	100	1000		20	0.3	1	0.7	
		NEW HRL =					10000.0				4.0	100.0				0.1			
	MW-301D	5/1/01						8.9	3										
	MW-301D	8/28/01						3.2	2	21	<0.1	1	<10	1.7	<1.0	0.21	<0.01	<0.01	230
	MW-301D	12/13/01						7.2	3										
	MW-301S	5/1/01						20	2										
	MW-301S	8/28/01						18	1	10	<0.10	0.79	<10	0.43	<1.0	<0.01	0.04	0.012	
	MW-301S	12/13/01						14	1										
	MW-302D	5/1/01					15	458	7										
	MW-302D	8/28/01					13	390	7	69	<0.10	4.8	38	20	<1.0	0.15	0.01	<0.01	<10
	MW-302D	12/13/01					16	514	8										
	MW-302S	5/1/01					0.2	2.3	2										
	MW-302S	8/28/01					0.2	3	2	4.2	<0.10	0.51	<10	5.6	<1.0	0.86	0.01	<0.01	400
	MW-302S	12/13/01					0.4	3.7	4										
	MW-303D	5/1/01			2		13.5	211.8	15										
	MW-303D	8/28/01			0.9		0.8	13.8	8	130	<0.10	3.5	<10	5.6	<1.0	0.22	<0.01	<0.01	310
	MW-303D	12/13/01			0.7		0.8	32.7	10										
	MW-304D	5/1/01						ND	0										
	MW-304D	8/27/01						ND	0	1.3	<0.10	3.4	<10	0.22	<1.0	0.23	0.01	<10	
	MW-304D	12/13/01						ND	0										
	MW-403	5/1/01						ND	0										
	MW-403	8/27/01						ND	0	1.4	<0.1	1.4	<10	<0.02	<1.0	0.31	<0.01	<0.01	160
	MW-403	12/12/01						1.2	1										
	MW-502	5/1/01						ND	0										
	MW-502	8/28/01						ND	0	7	<0.1	<0.5	<10	0.58	<1.0	0.16	<0.01	<0.01	150
	MW-502	12/12/01						0.9	1										
	MW-503	5/1/01						ND	0										
	MW-503	8/28/01						ND	0	2.5	<0.10	<0.05	<10	0.059	<1.0	0.15	<0.01	<0.01	140
	MW-503	12/12/01						1.1	1										
	MW-504	5/1/01						ND	0										
	MW-504	8/28/01						ND	0	<1.0	<0.10	51	<10	0.43	<1.0	0.037	<0.01	<0.01	230
	MW-504	12/12/01						ND	0										
	MW-701	4/30/01						ND	0										
	MW-701	8/28/01						ND	0	<1.0	<0.10	1.6	<10	<0.02	<1.0	0.31	0.01	<0.01	570
	MW-701	12/12/01						ND	0										
	SW-S	5/1/01						ND	0										
	SW-SW	5/1/01						ND	0										
	TRIP BLANK	4/30/01						ND	0										
	TRIP BLANK	8/27/01						56	1										
	TRIP BLANK	12/13/01						ND	0										
	FIELD BLANK	5/1/01						ND	0										
	FIELD BLANK	8/27/01						ND	0	<1.0	<0.10	<0.50	<10	<0.02	<1.0	<0.01	<0.01	<0.01	<10
	FIELD BLANK	12/12/01						ND	0										
	LAB BLANK	11/29/92						4	1										
	LAB BLANK	4/25/94						2	1										
	MAXIMUM CONCENTRATION		0	0		0	16	514		130	0	51	38	20	0	0.86	0.04	0.012	
	IL EXCEEDANCE		0			0	0			3	0	1	0		0		0		
	RAL EXCEEDANCE		0	0		0	0			9	0	0	0		0	3	0	0	
	HRL EXCEEDANCE						0				0	0				9			

Table 2A (continued)

Oak Grove Sanitary Landfill		Solids, Suspended	Solids, Dissolved	Chloride	Sulfate	Nitrate+Nitrite, Total	Ammonia Nitrogen, Total	T.O.C. Elevation
WELL NUMBER	SAMPLE DATE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
OLD TL =								
NEW RAL =								
NEW HRL =								
MW-301D	5/1/01							1000.00
MW-301D	8/28/01	3.6	330	15	24	<0.05	0.18	
MW-301D	12/13/01							
MW-301S	5/1/01							
MW-301S	8/28/01							
MW-301S	12/13/01							
MW-302D	5/1/01							
MW-302D	8/28/01	47	2100	480	<5.0	<0.05	60	
MW-302D	12/13/01							
MW-302S	5/1/01							
MW-302S	8/28/01	14	420	15	<5.0	<0.05	0.35	
MW-302S	12/13/01							
MW-303D	5/1/01							
MW-303D	8/28/01	18	260	13	5.3	<0.05	22.1	
MW-303D	12/13/01							
MW-304D	5/1/01							
MW-304D	8/27/01							
MW-304D	12/13/01							
MW-403	5/1/01							
MW-403	8/27/01	<1.0	240	21	24	<0.05	<0.05	
MW-403	12/12/01							
MW-502	5/1/01							
MW-502	8/28/01	<1.0	170	2.3	5.7	<0.05	0.14	
MW-502	12/12/01							
MW-503	5/1/01							
MW-503	8/28/01	<1.0	210	7.9	23	<0.05	0.05	
MW-503	12/12/01							
MW-504	5/1/01							
MW-504	8/28/01	2	670	140	11	2.6	<0.05	
MW-504	12/12/01							
MW-701	4/30/01							
MW-701	8/28/01	<1.0	630	27	16	<0.05	0.13	
MW-701	12/12/01							
SW-S	5/1/01							
SW-SW	5/1/01							
TRIP BLANK	4/30/01							
TRIP BLANK	8/27/01							
TRIP BLANK	12/12/01							
FIELD BLANK	5/1/01							
FIELD BLANK	8/27/01	<1.0	<4.0	<1.0	<5.0	<0.05	<0.05	
FIELD BLANK	12/12/01							
LAB BLANK	11/29/92							
LAB BLANK	4/25/94							
MAXIMUM CONCENTRATION								1000.00
IL EXCEEDANCE								
RAL EXCEEDANCE								4.00
HRL EXCEEDANCE								9.00